

	    CERTIFICATE 2518.08 MS ISO/IEC 17025 TESTING SAMM NO. 0825																																
MOTOROLA PENANG ADV. COMM. LABORATORY Motorola Solutions Malaysia SDN BHD, Plot 2A, Medan Bayan Lepas, Mukim 12 S.W.D, 11900 Bayan Lepas, Penang, Malaysia.	FCC/ISED TEST REPORT Report Revision : Rev.A																																
<table><tr><td>Date/s Tested</td><td>: 11-SEP-2020 - 15-SEP-2020</td></tr><tr><td>Report Issue Date</td><td>: 6-OCT-2020</td></tr><tr><td>Manufacturer</td><td>: Motorola Solutions Malaysia SDN BHD</td></tr><tr><td>Manufacturer Address</td><td>: Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia</td></tr><tr><td>Requestor</td><td>: SIEW KHENG TAN</td></tr><tr><td>Product Type</td><td>: Portable</td></tr><tr><td>Product Version (PMN)</td><td>: MSLB-MKZ900</td></tr><tr><td>Model Number (HVIN)</td><td>: AAH90ZDU9RH1AN (PMUE5674A)</td></tr><tr><td>Frequency Band</td><td>: 400-512MHz</td></tr><tr><td>Max RF Output Power</td><td>: 4.8 Watts</td></tr><tr><td>Applicant Name</td><td>: Motorola Solutions Inc</td></tr><tr><td>Applicant Address</td><td>: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322</td></tr><tr><td>ISED Registrations</td><td>: MY0001</td></tr><tr><td>FCC Registrations</td><td>: 461337</td></tr><tr><td>Firmware Version (FVIN)</td><td>: 102.21.01.0029</td></tr></table>  The equipment was tested accordance to the requirement listed below: <table><tr><td>(LMR) FCC 47 CFR Part 2 / 22 / 74 / 90 ISED RSS- Gen Issue 5 / 119 Issue 12</td><td>PASS</td></tr></table>		Date/s Tested	: 11-SEP-2020 - 15-SEP-2020	Report Issue Date	: 6-OCT-2020	Manufacturer	: Motorola Solutions Malaysia SDN BHD	Manufacturer Address	: Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia	Requestor	: SIEW KHENG TAN	Product Type	: Portable	Product Version (PMN)	: MSLB-MKZ900	Model Number (HVIN)	: AAH90ZDU9RH1AN (PMUE5674A)	Frequency Band	: 400-512MHz	Max RF Output Power	: 4.8 Watts	Applicant Name	: Motorola Solutions Inc	Applicant Address	: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322	ISED Registrations	: MY0001	FCC Registrations	: 461337	Firmware Version (FVIN)	: 102.21.01.0029	(LMR) FCC 47 CFR Part 2 / 22 / 74 / 90 ISED RSS- Gen Issue 5 / 119 Issue 12	PASS
Date/s Tested	: 11-SEP-2020 - 15-SEP-2020																																
Report Issue Date	: 6-OCT-2020																																
Manufacturer	: Motorola Solutions Malaysia SDN BHD																																
Manufacturer Address	: Plot 2A, Medan Bayan Lepas, Mukim 12 SWD, 11900 Bayan Lepas, Penang, Malaysia																																
Requestor	: SIEW KHENG TAN																																
Product Type	: Portable																																
Product Version (PMN)	: MSLB-MKZ900																																
Model Number (HVIN)	: AAH90ZDU9RH1AN (PMUE5674A)																																
Frequency Band	: 400-512MHz																																
Max RF Output Power	: 4.8 Watts																																
Applicant Name	: Motorola Solutions Inc																																
Applicant Address	: 8000 West Sunrise Boulevard, Fort Lauderdale, Florida 33322																																
ISED Registrations	: MY0001																																
FCC Registrations	: 461337																																
Firmware Version (FVIN)	: 102.21.01.0029																																
(LMR) FCC 47 CFR Part 2 / 22 / 74 / 90 ISED RSS- Gen Issue 5 / 119 Issue 12	PASS																																
This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.																																	
Prepared By:  Gan Boon Teong Test Personnel	Approved Signatory: Vincent Foong Chuen Kit Responsible Engineer																																

Table of Contents

Report Revision History	3
1.0 General Information.....	4
2.0 Summary of Test Results	5
3.0 Measurement Uncertainty	6
4.0 Equipment List.....	7
5.0 Test Condition.....	10
5.1. Transmitter Test Conditions	10
6.0 Transmitter Test Parameters	11
6.1. RF Output Power	11
6.1.1. Test Setup.....	11
6.1.2. Test Result	11
6.2. Frequency Stability	12
6.2.1. Test Setup.....	12
6.2.2. Test Result	13
6.2.3. Test Limit.....	14
6.3. Audio Frequency Response	15
6.3.1. Test Setup.....	15
6.3.2. Test Result	16
6.3.3. Test Limit.....	19
6.4. Audio Low Pass Filter Response	20
6.4.1. Test Setup.....	20
6.4.2. Test Result	21
6.4.3. Test Limit.....	24
6.5. Modulation Limiting	25
6.5.1. Test Setup.....	25
6.5.2. Test Result	26
6.5.3. Test Limit.....	28
6.6. Occupied Bandwidth.....	29
6.6.1. Test Setup (Analog)	29
6.6.2. Test Result (Analog).....	30
6.6.3. Test Setup (Digital).....	37
6.6.4. Test Result (Digital).....	38
6.6.5. Test Limit.....	46
6.7. Band Edge Conducted Spurious Emission (Part 22)	47
6.7.1. Test Setup (Analog)	47
6.7.2. Test Result (Analog).....	48
6.7.3. Test Setup (Digital).....	50
6.7.4. Test Result (Digital).....	51
6.7.5. Test Limit.....	52
6.8. Transient Frequency Behavior.....	53
6.8.1. Test Setup.....	53
6.8.2. Test Result	54
6.8.3. Test Limit.....	56

6.9.	Adjacent Channel Power.....	57
6.9.1.	Test Setup (Analog)	57
6.9.2.	Test Result	57
6.9.3.	Test Setup (Digital).....	58
6.9.4.	Test Result	58
6.9.5.	Test Limit.....	59
6.10.	Conducted Spurious Emission	61
6.10.1.	Test Setup.....	61
6.10.2.	Test Result (Analog)	62
6.10.3.	Test Result (Digital).....	66
6.10.4.	Test Limit.....	79
6.11.	Radiated Spurious Emission	80
6.11.1.	Test Setup.....	80
6.11.2.	Test Result (Analog)	81
6.11.3.	Test Result (Digital).....	89
6.11.4.	Test Limit.....	90
6.12.	Effective Radiated Power (ERP)	98
6.12.1.	Test Setup.....	98
6.12.2.	Test Result	98
6.12.3.	Test Limit.....	98
6.13.	GNSS (EIRP for 1559 - 1610MHz).....	99
6.13.1.	Test Setup.....	99
6.13.1.	Test Result	99
6.13.2.	Test Limit.....	99

Report Revision History

Revision History	Description	Date	Originator
Rev. A	Initial Report	17-SEP-2020	Gan Boon Teong

1.0 General Information

EUT Description:

Technologies	Land Mobile Radio (LMR)
Modulation Type	Analog, 4FSK

The EUT contains following accessory devices and data cable:

Item	Brand	Model or P/N
BATTERY PACK,BATTERY PACK,IMPRES GEN2, LIION,IP68, 2900T, TIA4950	MOTOROLA	PMNN4804A
UHF STUBBY ANTENNA (400-527MHZ), 90MM, FERRULE	MOTOROLA	AN000348A01

General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

ANSI C63.4-2014

ANSI C63.26-2015

No modifications were done to the UUT to facilitate the tests in this report.

Deviation from standard

Not applicable as no deviation from standard test method

2.0 Summary of Test Results

FCC General Rules Part (47CFR)	ISED General Rules Part	Test Item	Result	Remarks	Serial number tested
2.1046, 90.541, 22.565, 74.461, 74.534, 80.515	RSS-119	RF Power Output	Pass		734TWP0366
2.1055, 90.213, 22.355, 74.464, 74.561	RSS-119	Frequency Stability	Pass		734TWP0366
2.1047, 74.463, 80.213	RSS-119	Audio Frequency Response	Pass		734TWP0366
2.1047, 74.463, 80.213	RSS-119	Audio Low Pass Filter Response	Pass		734TWP0366
2.1047, 74.463, 80.213	RSS-119	Modulation limiting	Pass		734TWP0366
2.1049, 90.210, 22.359, 74.462, 74.535, 80.211(c), 80.211(f)	RSS-119	Occupied Bandwidth	Pass	16K0F3E- 15.0075kHz 11K0F3E- 9.8814kHz 7K60F1D- 7.3666kHz 7K60F1E- 7.0470kHz 7K60F1W- 7.3715kHz	734TWP0366
22.359 (a), (b)	RSS-119	Band Edge Conducted Spurious Emission	Pass		734TWP0366
90.214	RSS-119	Transient Frequency Behavior	Pass		734TWP0366
90.543(a), (b)	-	Adjacent Channel Power	NA		
Low end of the band, Federal, Low end of part 90, 74D, 74H, 90, 22, 22E, 80, High end of 90	RSS-119	Conducted Spurious Emissions	Pass	Highest emission: -37.99dBm	734TWP0366
Low end of the band, Federal, Low end of part 90, 74D, 74H, 90, 22, 22E, 80, High end of 90	RSS-119	Radiated Spurious Emission	Pass	Highest emission: No spur detected (noise floor)	734TWP0311
-	-	GNSS (EIRP for 1559 – 1610MHz)	NA		
-	-	Effective Radiated Power (ERP)	NA		

NA → Not Applicable

3.0 Measurement Uncertainty

Measurement	Frequency	Expended Uncertainty (k=1.96) (±)
AC Power Line Conducted Spurious Emission	150KHz ~ 30MHz	3.43 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	5.01 dB
	200MHz ~ 1000MHz	5.01 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.01 dB
	18GHz ~ 25GHz	5.01 dB
Conducted Spurious Emissions	9kHz ~ 12.75GHz	2.82 dB
Frequency Stability	9kHz ~ 12.75GHz	0.0085 ppm
Audio Frequency Response / Low Pass Filter Response	300Hz – 20kHz	4.09 %
Modulation Limiting	300Hz – 3kHz	1.15 %
Occupied Bandwidth	9kHz ~ 12.75GHz	2.82 dB
Band Edge Conducted Spurious Emission	9kHz ~ 12.75GHz	2.82 dB
Transient Frequency Behavior	9kHz ~ 12.75GHz	5.4 ms
Adjacent Channel Power	9kHz ~ 12.75GHz	2.82 dB

4.0 Equipment List

FCC Analog ATE#1: (SW version: 2.4.6 & FCC_Frequency Stability 1.0.3 rev.)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
CHAMBER	SH-641	92009188	06-Mar-20	06-Mar-21
DSA Dynamic Signal Analyzer	35670A	MY42507095	19-Jun-20	19-Jun-21
ANALYZER AUDIO	8903B	3729A17612	15-Nov-19	15-Nov-20
POWER METER	E4416A	MY45102699	26-Jun-20	26-Jun-21
POWER SENSOR	E9301B	MY41498918	12-Aug-20	12-Aug-21
POWER SUPPLY	6031A	3325A02771	13-Mar-20	13-Mar-21
SIGNAL GENERATOR	2042	119718/063	24-Jun-20	24-Jun-21
ANALYZER MODULATION	8901B	3122A03662	08-Jul-20	08-Jul-21
N to N RF Cable # 1	M17/128-RG400	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to BNC RF Cable # 7	RG 58	NA	NA	NA
N to SMA RF Cable # 1	RG 58	NA	NA	NA
N to SMA RF Cable # 2	RG 58	NA	NA	NA
N to SMA RF Cable # 3	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-34-LIM	NA	NA	NA

FCC Transient ATE #1: (SW version: FCC Transient ATE_R1.1.3)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR
ATTENUATOR / SWITCH DRIVER	11713A	2508A10141	CNR	CNR
POWER METER	E4416A	GB41293866	26-Feb-19	26-Feb-21
POWER SUPPLY	6032A	MY41002067	22-Feb-20	22-Feb-21
SIGNAL GENERATOR	8657A	3250A05137	19-Jun-20	19-Jun-21
STEP ATTENUATOR	8494G	MY42143006	12-Jun-20	12-Jun-21
STEP ATTENUATOR	8496G	MY42143012	13-Jun-20	13-Jun-21
OSCILLOSCOPE	MSO8104A	MY45002372	26-Jun-20	26-Jun-21
ANALYZER MODULATION	8901B	3438A05093	23-Jun-20	23-Jun-21
ANALYZER AUDIO	8903B	3011A12671	11-Mar-20	11-Mar-21
ANALYZER AUDIO	8903B	3011A08952	29-Jul-20	29-Jul-21
SPECTRUM ANALYZER	E4440A	MY46181974	2-Aug-20	2-Aug-21
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	M17/128-RG400	NA	NA	NA
N to N RF Cable # 3	M17/128-RG400	NA	NA	NA
N to N RF Cable # 4	M17/128-RG400	NA	NA	NA
N to N RF Cable # 5	M17/128-RG400	NA	NA	NA
N to N RF Cable # 6	M17/128-RG400	NA	NA	NA
N to N RF Cable # 7	M17/128-RG400	NA	NA	NA
N to N RF Cable # 8	M17/128-RG400	NA	NA	NA
N to N RF Cable # 9	M17/128-RG400	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
BNC to BNC RF Cable # 2	RG 58	NA	NA	NA
BNC to BNC RF Cable # 3	RG 58	NA	NA	NA
BNC to BNC RF Cable # 4	RG 58	NA	NA	NA
BNC to BNC RF Cable # 5	RG 58	NA	NA	NA
BNC to BNC RF Cable # 6	RG 58	NA	NA	NA
BNC to N RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 10dB	49-10-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	NA
SWITCH CONTROL UNIT	3488A	2719A36210	CNR	CNR

CONDUCTED SPUR EMISSION ATE # 1 (SW version: Conducted Spur ATE_rev 1.23.03)

Description	Model	Serial Number	Calibration Date	Calibration Due Date
SWITCH CONTROL UNIT	3488A	2719A32735	CNR	CNR
ANALYZER SPECTRUM	E4440A	MY46185415	10-Jan-20	10-Jan-22
POWER SUPPLY	6031A	3543A03489	05-Jun-20	05-Jun-21
HIGH PASS FILTER SWITCH BOX	-	CS001	2-Jul-20	2-Jul-21
N to N RF Cable # 1	SF126/11N/11N	NA	NA	NA
N to N RF Cable # 2	SF126/11N/11N	NA	NA	NA
BNC to BNC RF Cable # 1	RG 58	NA	NA	NA
Aeroflex Attenuator 30dB	49-30-43-LIM	NA	NA	NA
Aeroflex Attenuator 10dB	33-10-34-LIM	NA	NA	NA

EMC Chamber 1

DESCRIPTION	MODEL	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
DRG HORN FREQ.	SAS-571	720	21-Mar-19	21-Mar-21
DRG HORN FREQ.	SAS-571	1143	14-Feb-19	14-Feb-21
POWER SUPPLY (0-60V / 0-50A, 1000W)	6032A	2615A01178	21-MAY-20	21-MAY-21
SIGNAL GENERATOR	SMB 100A	181117	8-Nov-18	8-Nov-21
EMI TEST RECEIVER	ESW44	101750	24-Jul-19	24-Sep-20
EMI TEST RECEIVER	ESIB26	100017	19-Jul-19	19-Sep-20
5m Semi-anechoic Chamber	S800-HX	J2308	CNR	CNR
BILOG ANTENNA	CBL6112B	2964	23-Apr-19	23-Apr-21
BILOG ANTENNA	CBL6112B	2950	8-Jul-19	8-Jul-21
DATA LOGGER	SDL500	A.016776	4-Jun-20	4-Jun-21
SYSTEM CONTROLLER	SC104V	050806-1	CNR	CNR
TURNTABLE FLUSH MOUNT 2M	FM2011	NA	CNR	CNR
ANTENNA POSITIONING TOWER	TLT2	NA	CNR	CNR
BROAD-BAND HORN ANTENNA	BBHA9170	BBHA9170255	27-Jan-20	27-Jan-21
18 - 40GHz PREAMPLIFIER	Miteq Hi Gain Sucoflex	001	CNR	CNR
PREAMPLIFIER	PAM-0118	269	24-May-19	24-May-22
LOOP ANTENNA	6502	00208416	5-Sep-19	5-Sep-20
Test Software	EMC FCC IC Bluetooth RE Test			
Version	EMC FCC RE v1.6.2			

5.0 Test Condition

5.1. Transmitter Test Conditions

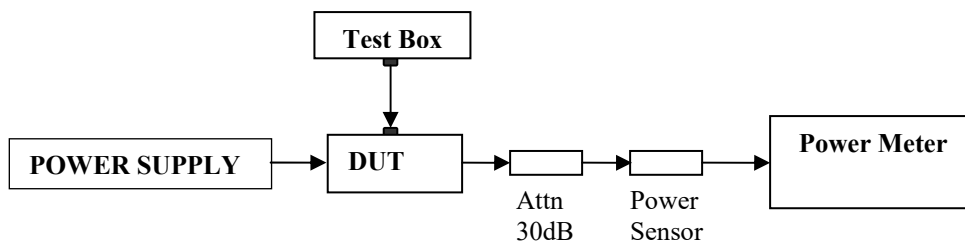
Test Item, (Channel Spacing)	Power (W)	Modulation	Test Frequency (MHz)	Tested By	Environmental conditions
RF Output Power	Low & Max	Analog	400.0125, 406.2, 450.025, 459.125, 467.775, 469.9875, 482.0125, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Frequency Stability	Max	Analog	467.775	Gan Boon Teong	25.1°C, 54.3%RH, 60.3°C, 50%RH, -30.1°C, 50%RH
Audio Frequency Response (12.5kHz / 25kHz)	Max	Analog	467.775, 459.125, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Audio Low Pass Filter Response (12.5kHz / 25kHz)	Max	Analog	467.775, 459.125, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Modulation limiting (12.5kHz / 25kHz)	Max	Analog	467.775, 459.125, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Occupied Bandwidth (12.5kHz / 20kHz / 25kHz)	Max	Analog, 4FSK	406.2, 450.025, 459.125, 467.775, 473.0125, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Band Edge Conducted Spurious Emissions (Part 22) (12.5kHz / 20kHz / 25kHz)	Max / Low	Analog, 4FSK	459.025, 459.65, 473.0125, 479.2875	Gan Boon Teong	25.4°C, 42.8%RH
Transient Frequency Behavior (UHF & VHF Band) (12.5kHz / 25kHz)	Max	Analog	467.775	Gan Boon Teong	25.4°C, 42.8%RH
Adjacent Channel Power (700MHz Band) (12.5kHz / 25kHz)	Max	NA	NA		
Conducted Spurious Emissions- (12.5kHz / 25kHz)	Low / Max	Analog, 4FSK	400.0125, 406.2, 450.025, 459.125, 467.775, 511.9875	Gan Boon Teong	25.4°C, 42.8%RH
Radiated Spurious Emission (12.5kHz / 25kHz)	Low / Max	Analog	400.0125, 406.2, 450.025, 459.125, 467.775, 511.9875	Nazrin&Qawiman	22.5°C, 64%RH
GNSS (EIRP for 1559 - 1610MHz) (12.5kHz / 25kHz)	Max	Analog	NA		
Effective Radiated Power (ERP) (12.5kHz / 25kHz)	Max	Analog	NA		

NA → Not Applicable

6.0 Transmitter Test Parameters

6.1. RF Output Power

6.1.1. Test Setup



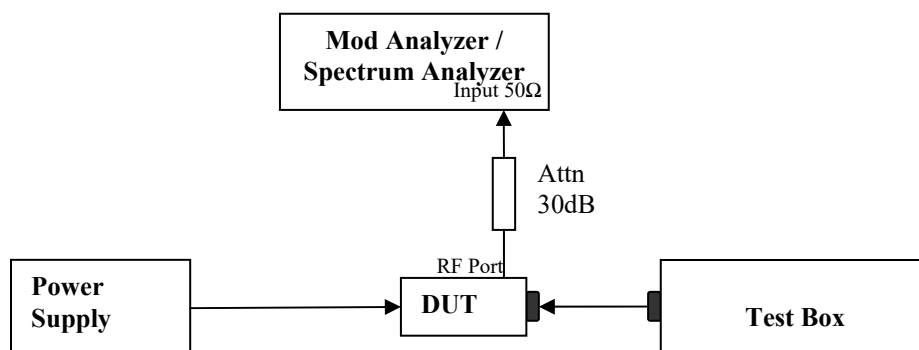
- 1) The DUT transmitter connected to Power Meter using the 30 dB attenuator and power sensor with above setup.
- 2) Path loss for the measurement included.
- 3) All the measurement was done at low, mid, high frequency for each band.
- 4) Record the power into the test report.

6.1.2. Test Result

Temperature	25°C				Remark
Voltage (V)	7.5V				
Frequency (MHz)	Low Power (W)	Current (A)	Max Power (W)	Current (A)	
400.0125	1.04	1.10	4.69	1.60	Not for FCC review
406.20000	1.07	0.93	4.63	1.58	
450.02500	0.93	0.72	4.62	1.53	
459.12500	0.95	0.80	4.63	1.47	
467.77500	0.94	0.89	4.71	1.80	
469.98750	0.95	0.73	4.70	1.92	
482.01250	0.98	0.80	4.66	1.86	
511.98750	0.97	0.95	4.63	1.58	

6.2. Frequency Stability

6.2.1. Test Setup

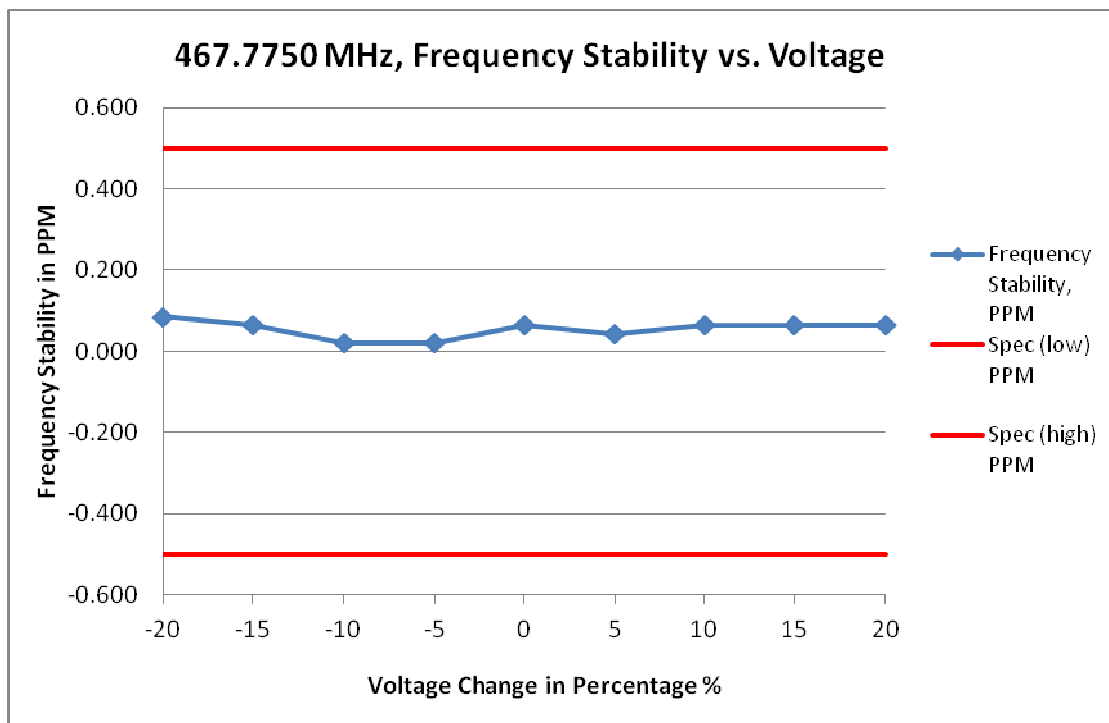


- 1) The DUT transmitter output port was connected to Modulation / Spectrum Analyzer.
- 2) Path loss for the measurement included.
- 3) Transmit the DUT and record the freq in MCF_{MHz} .
- 4) Test in 2 conditions:
 - Temperature: The frequency of the transmitter was measured from -30°C to 50°C.
 - Supply Voltage:
 - Mobile: The frequency of the transmitter was measured from 85% to 115% of the nominal operating input voltage.
 - Portable: The frequency of the transmitter was measured from nominal $\pm x\%$ as specified by the manufacturer
- 5) Calculate the ppm frequency error by the following:

$$ppm\ error = \left(\frac{MCF_{MHz}}{ACF_{MHz}} - 1 \right) * 10^6$$

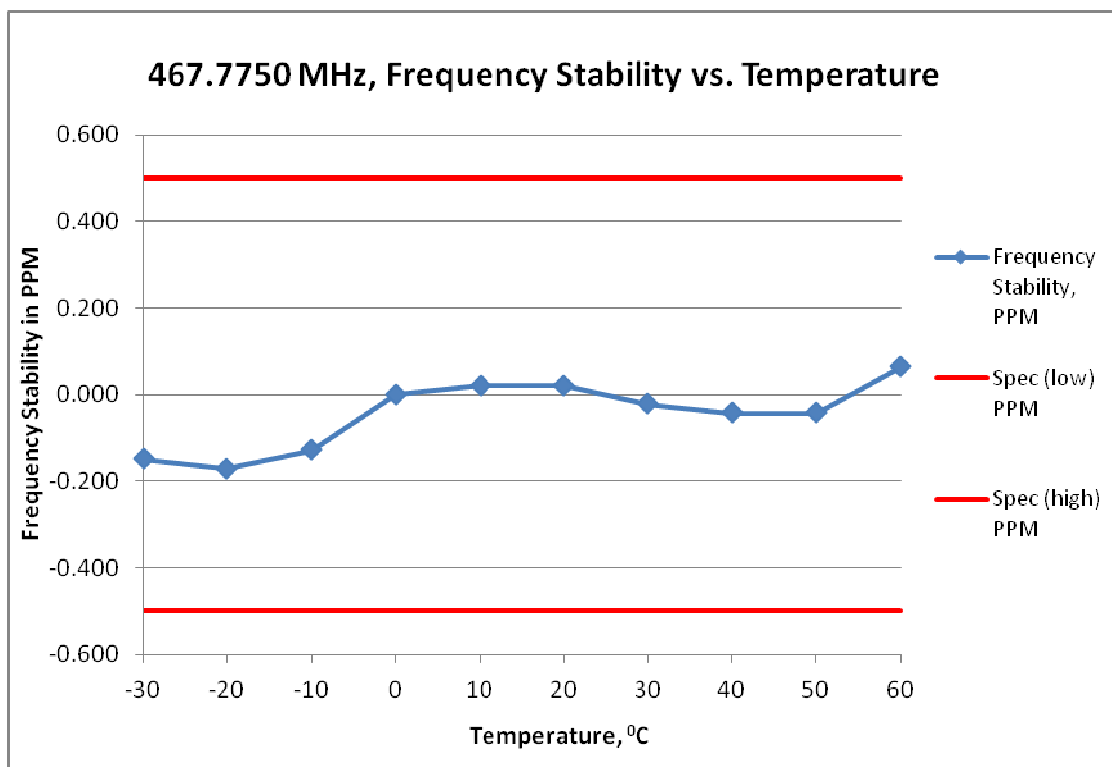
Where: MCF_{MHz} is the Measured Carrier Frequency in MHz
 ACF_{MHz} is the Assigned Carrier Frequency in MHz

6.2.2. Test Result



(i) Frequency Stability VS Voltage

Frequency / Channel Spacing	467.7750 MHz / 12.5 kHz				
Temperature, °C	25				
Voltage %	Voltage, V	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-20	6.000	467.775040	0.086	-0.500	0.500
-15	6.370	467.775030	0.064	-0.500	0.500
-10	6.750	467.775010	0.021	-0.500	0.500
-5	7.120	467.775010	0.021	-0.500	0.500
0	7.500	467.775030	0.064	-0.500	0.500
5	7.870	467.775020	0.043	-0.500	0.500
10	8.250	467.775030	0.064	-0.500	0.500
15	8.620	467.775030	0.064	-0.500	0.500
20	9.000	467.775030	0.064	-0.500	0.500



(ii) Frequency Stability VS temperature

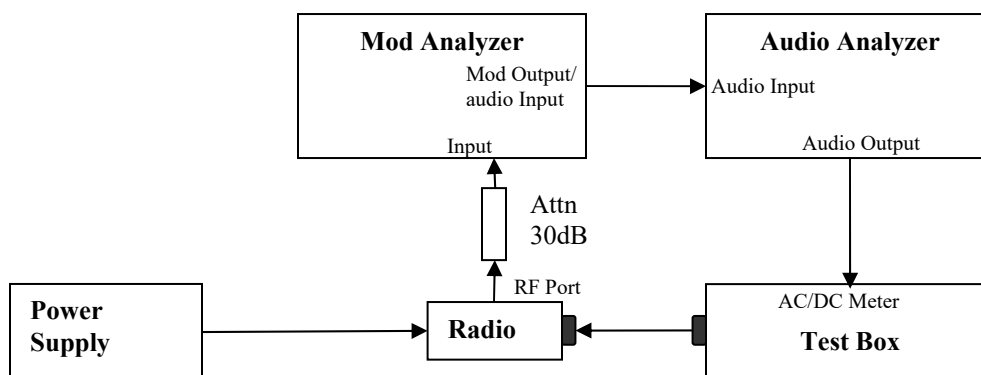
Frequency / Channel Spacing	467.7750 MHz / 12.5 kHz			
Voltage, V	7.5			
Temperature, °C	Frequency, MHz	Frequency Stability, PPM	Spec (low) PPM	Spec (high) PPM
-30	467.774930	-0.150	-0.500	0.500
-20	467.774920	-0.171	-0.500	0.500
-10	467.774940	-0.128	-0.500	0.500
0	467.775000	0.000	-0.500	0.500
10	467.775010	0.021	-0.500	0.500
20	467.775010	0.021	-0.500	0.500
30	467.774990	-0.021	-0.500	0.500
40	467.774980	-0.043	-0.500	0.500
50	467.774980	-0.043	-0.500	0.500
60	467.775030	0.064	-0.500	0.500

6.2.3. Test Limit

As per manufacturer declared spec +/- 0.5ppm

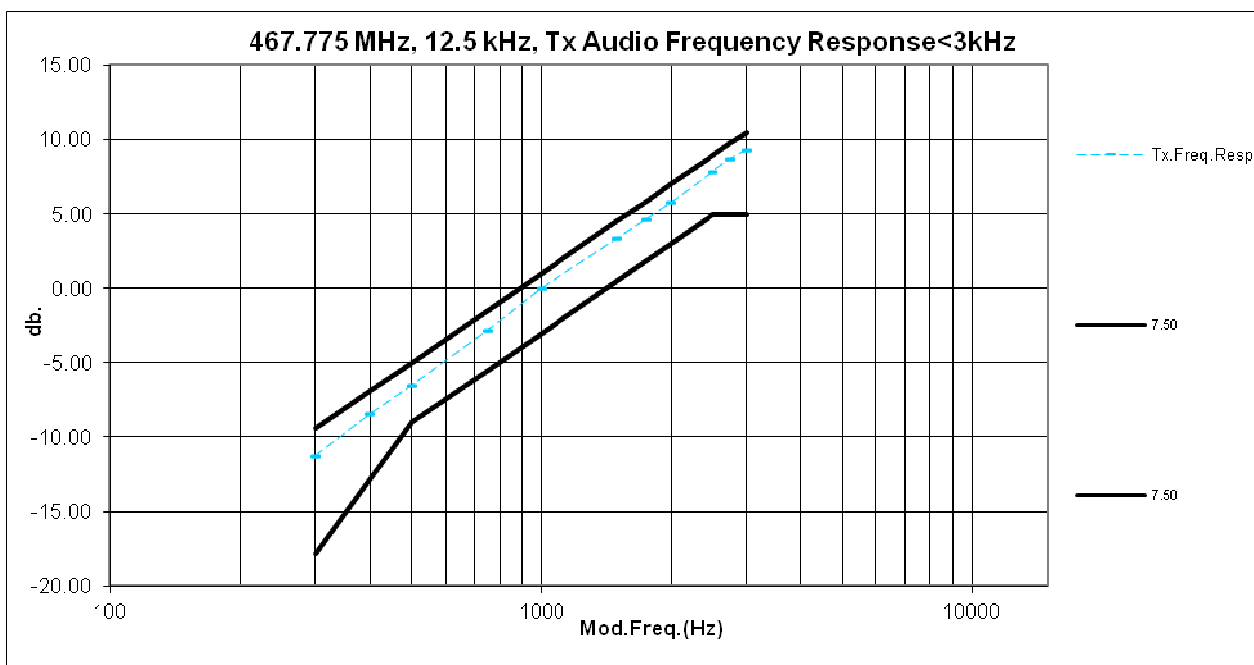
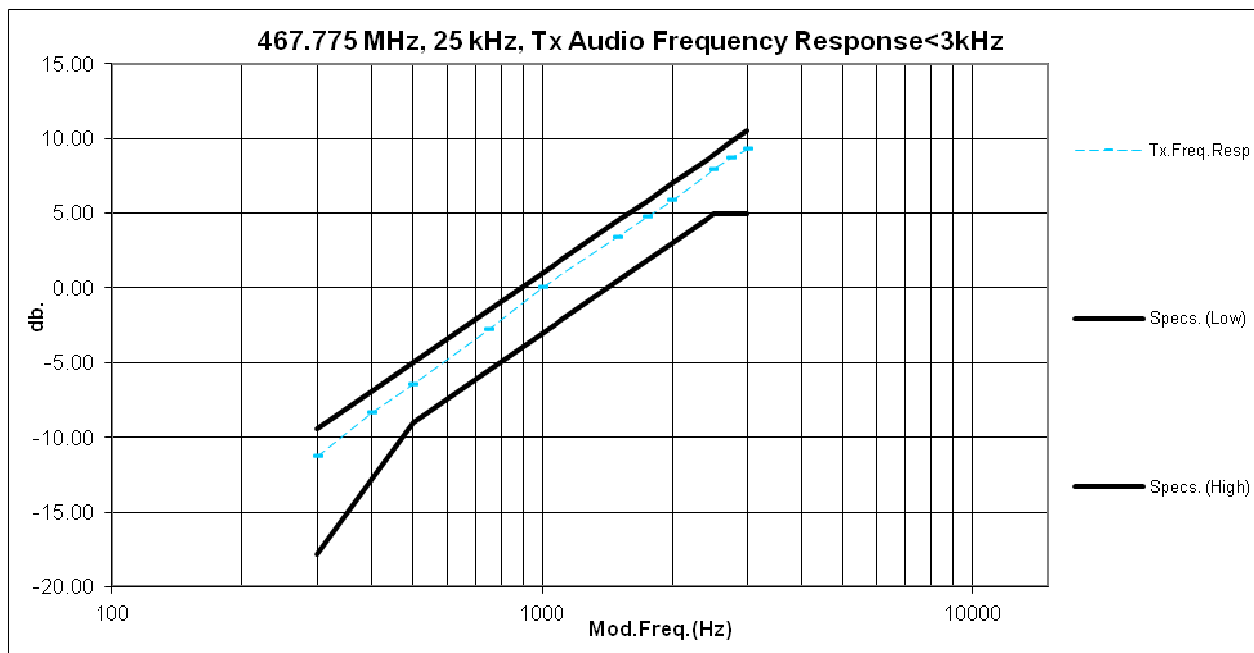
6.3. Audio Frequency Response

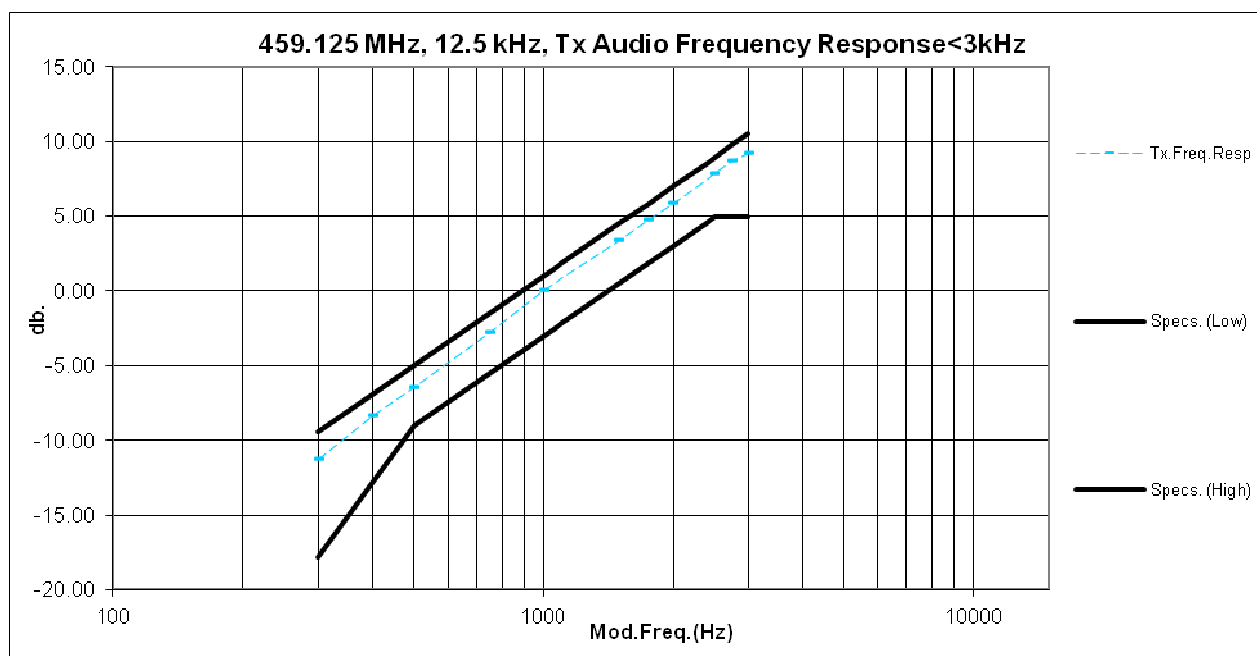
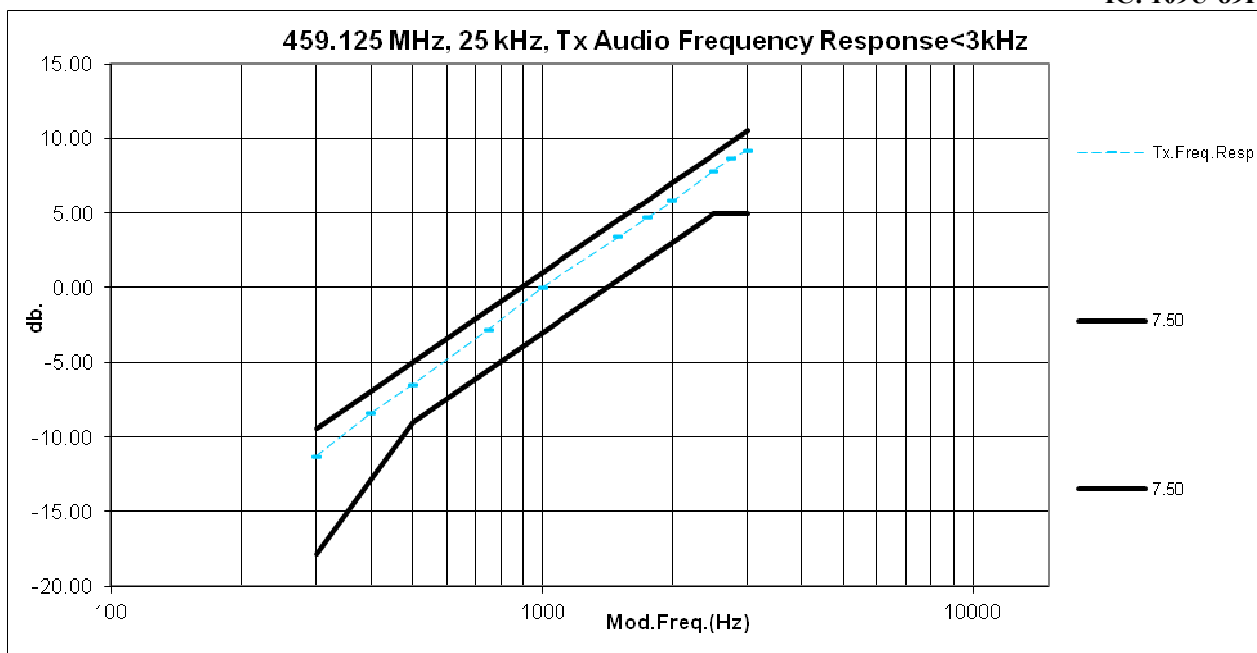
6.3.1. Test Setup

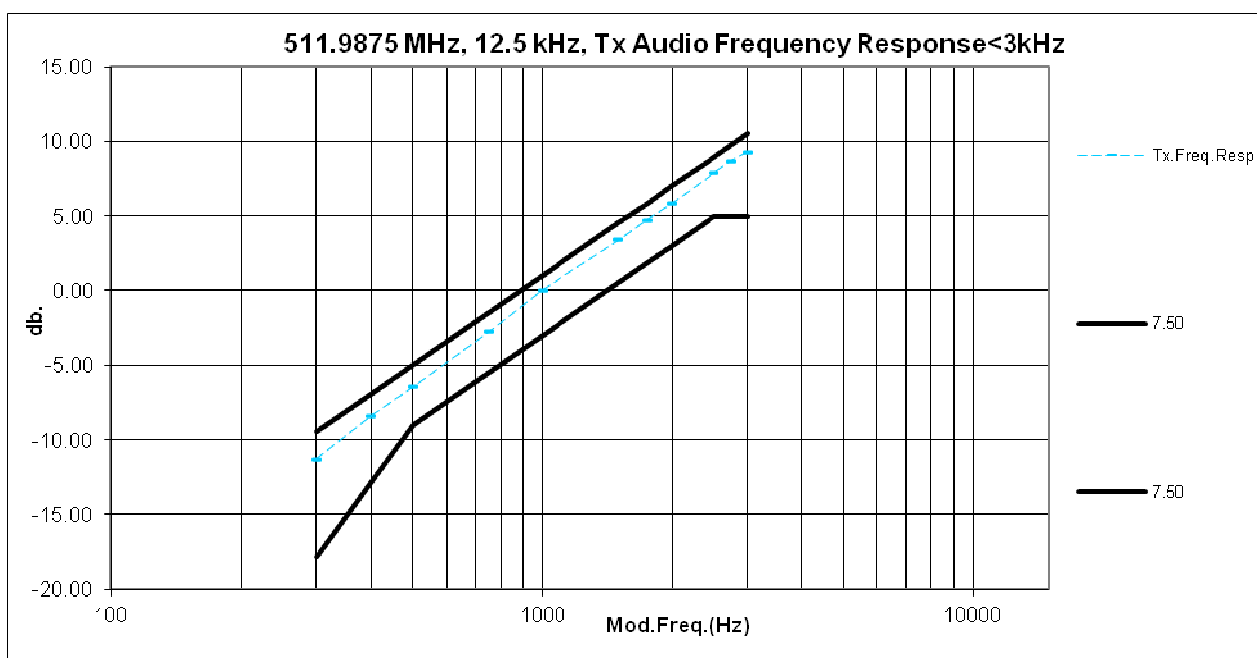
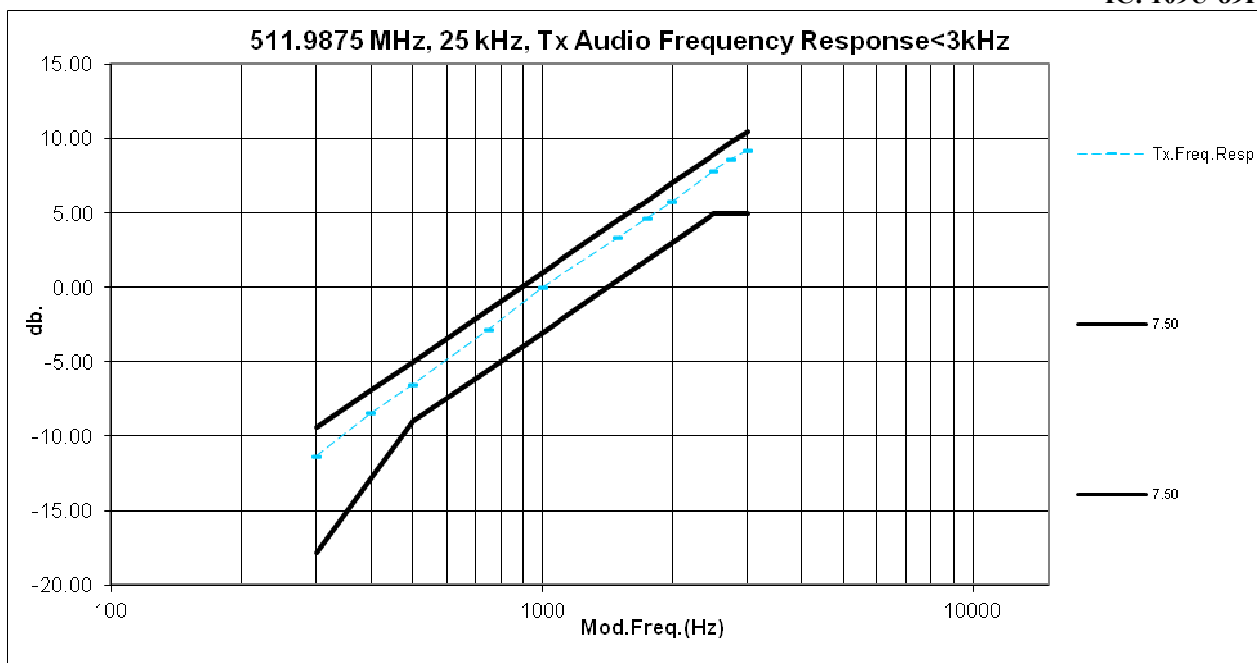


- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz and 50 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 20% of the Full rated system deviation.
- 5) On audio analyzer, set the rated level as reference to zero.
- 6) Vary the audio frequency from 300 Hz to 3 kHz. Record the change in dB on the audio analyzer.

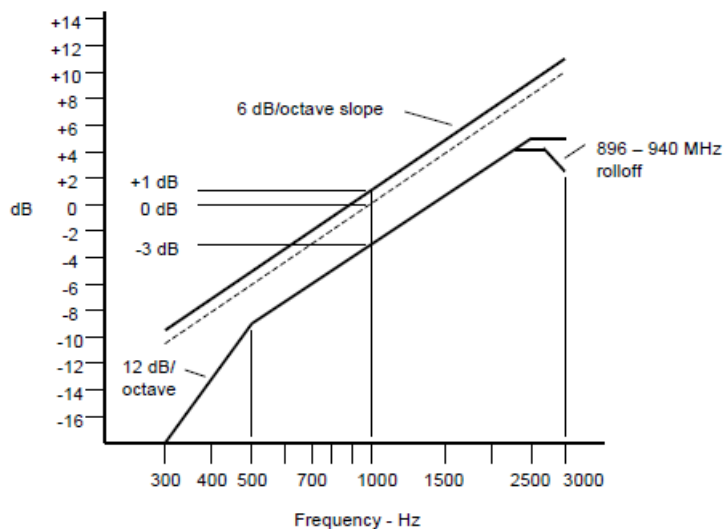
6.3.2. Test Result







6.3.3. Test Limit

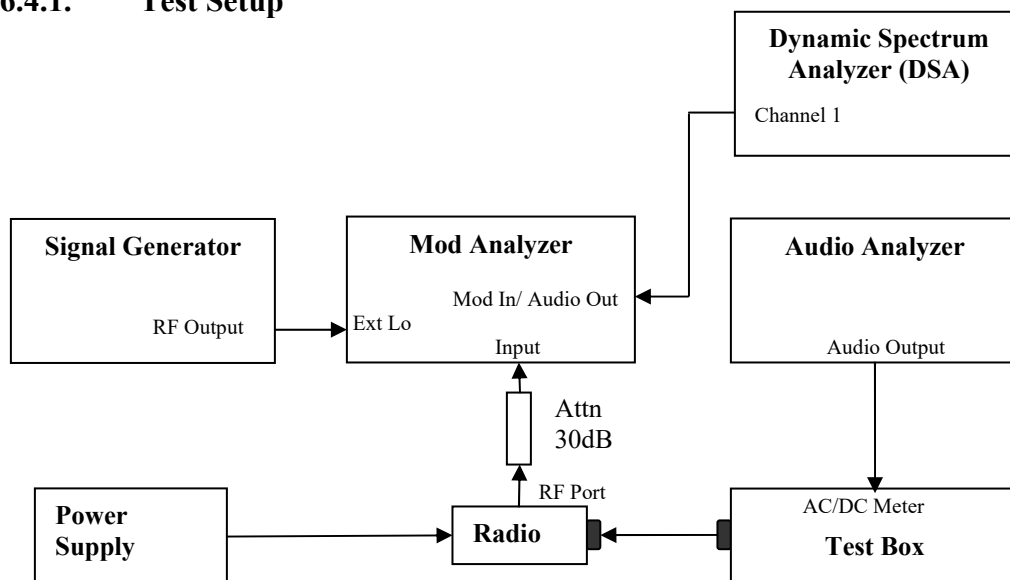


Note:

- o There are additional 6 dB per octave attenuation is allowed from 2.5KHz to 3KHz in equipment 25MHz to 869MHz radio.
- o Additional 6 dB per octave attenuation is allowed from 2.3KHz to 2.7KHz & additional 12 dB per octave attenuation is allowed from 2.7KHz to 3KHz in equipment 896MHz to 940MHz radio.

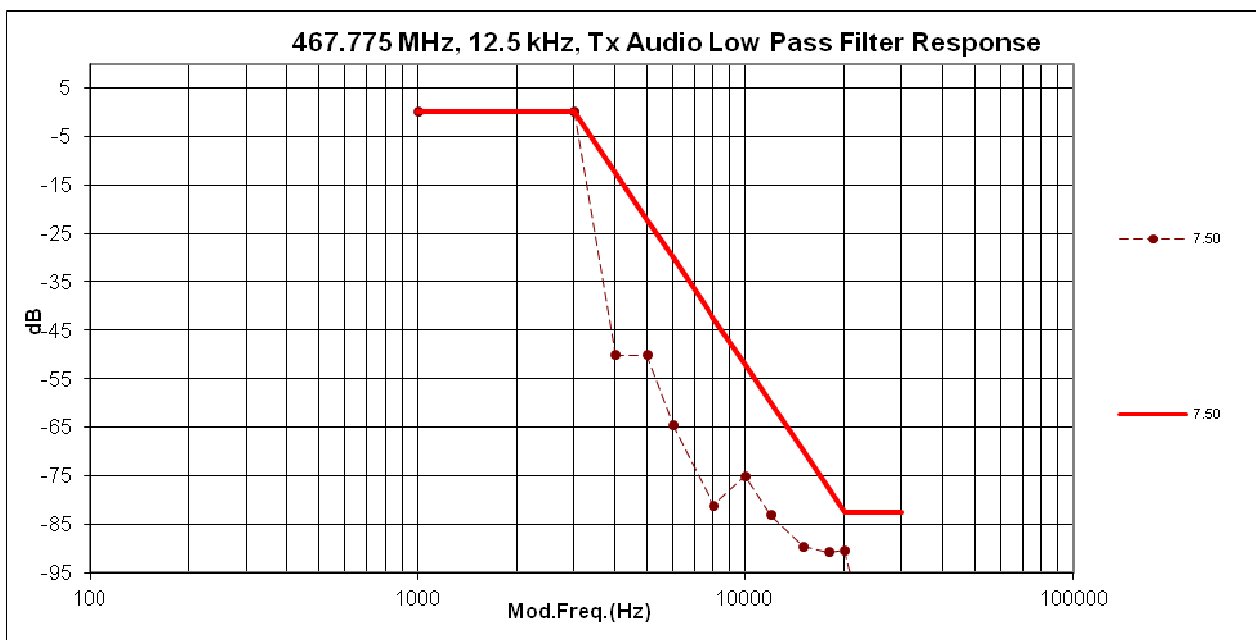
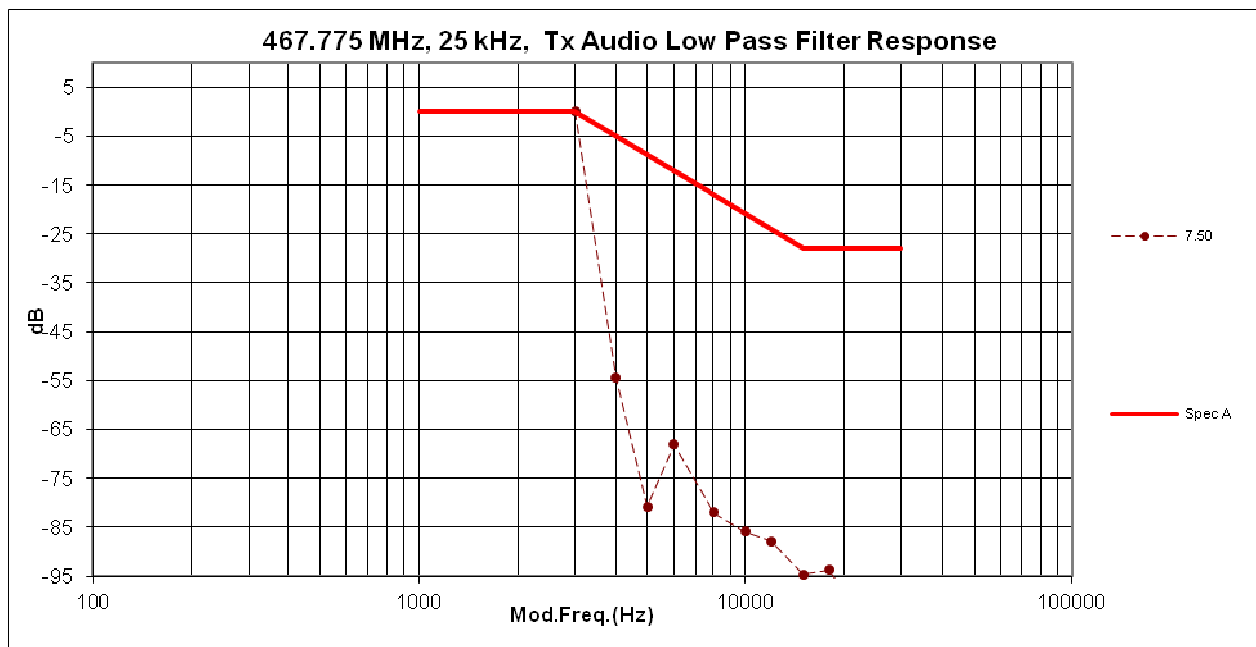
6.4. Audio Low Pass Filter Response

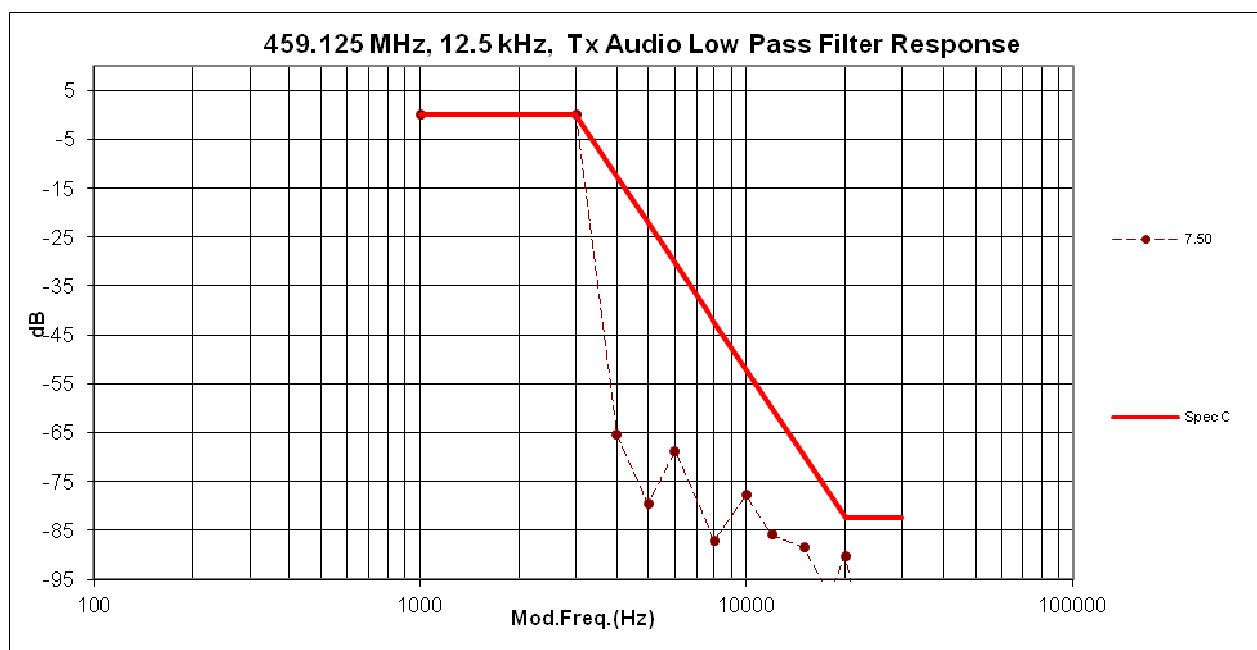
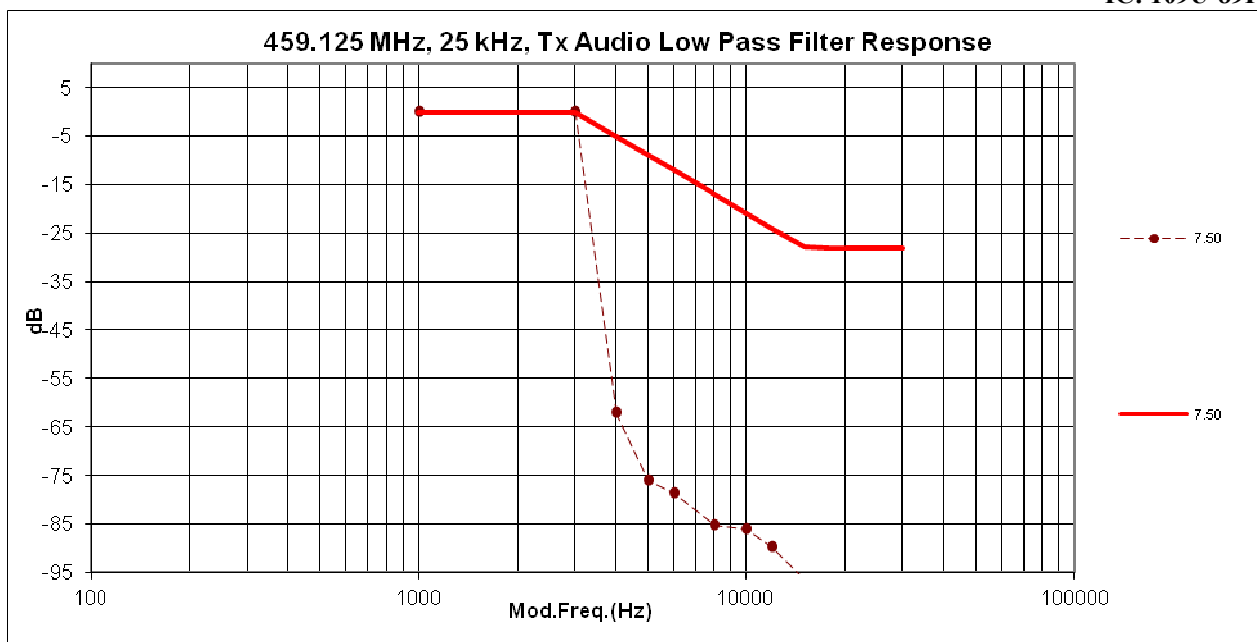
6.4.1. Test Setup

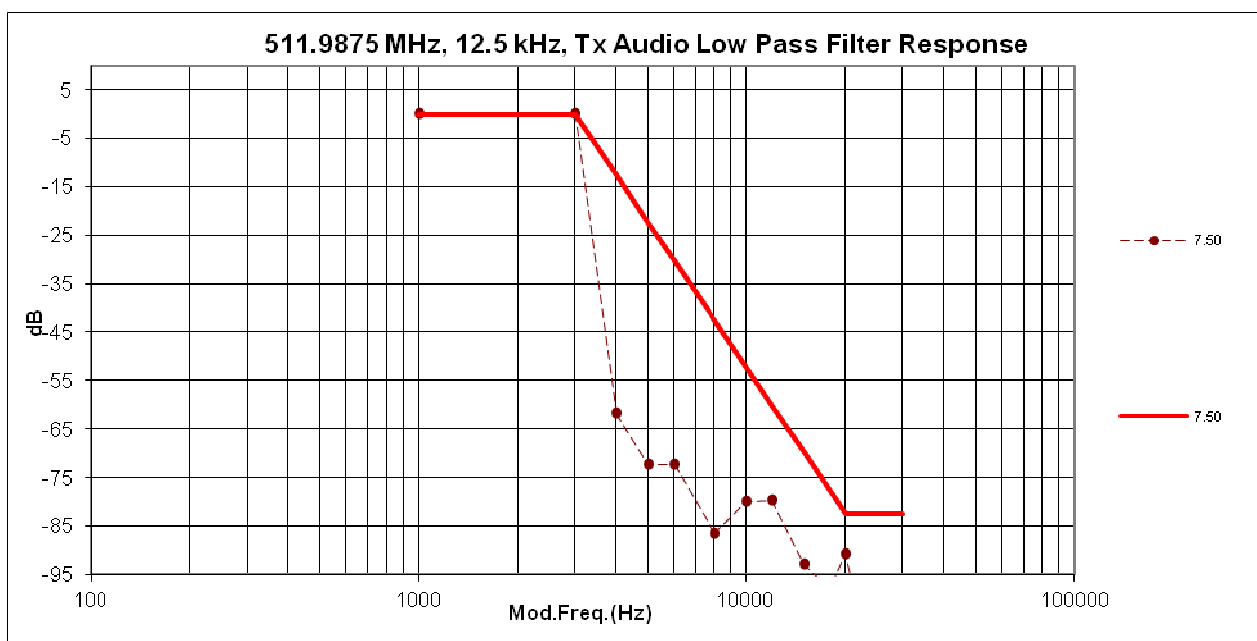
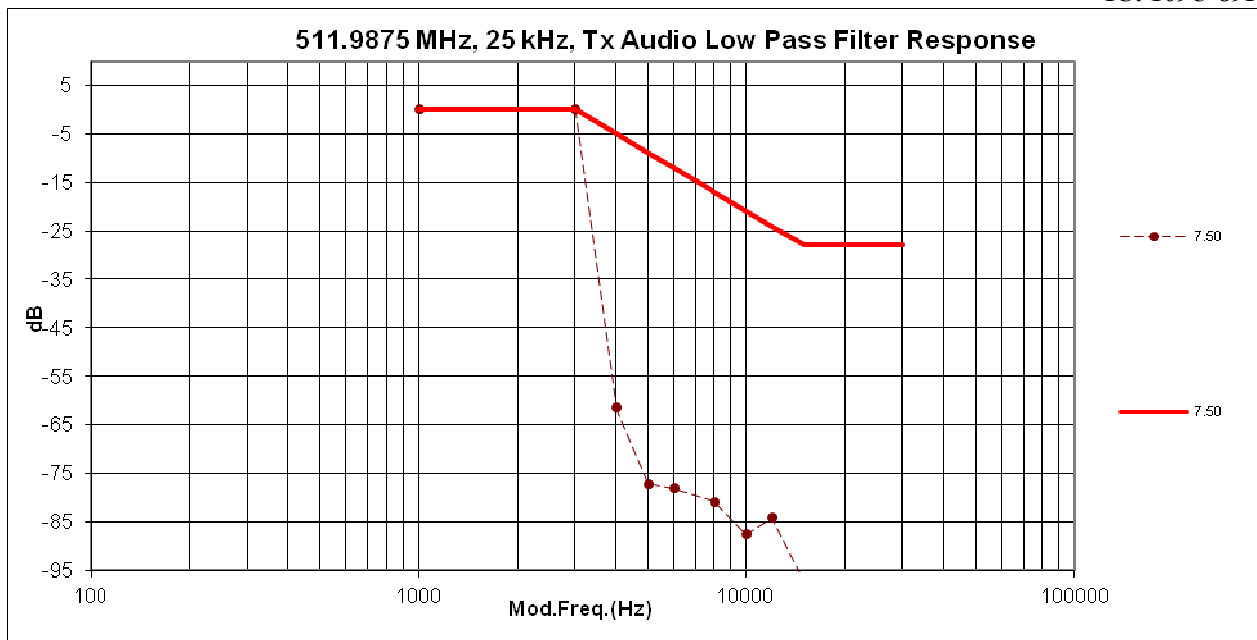


- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Press 23.1SPCL on modulation analyzer to enable the external LO from Sigen.
- 4) Set the Sigen frequency to $F_c + 1.5$ MHz, RF output level to 0dBm without modulation.
- 5) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
- 6) Up the amplitude by 20dB.
- 7) On DSA, get the reference point to 0dB.
- 8) Vary the frequency on audio analyzer from 3 kHz to 20 kHz, record the audio tone from DSA.

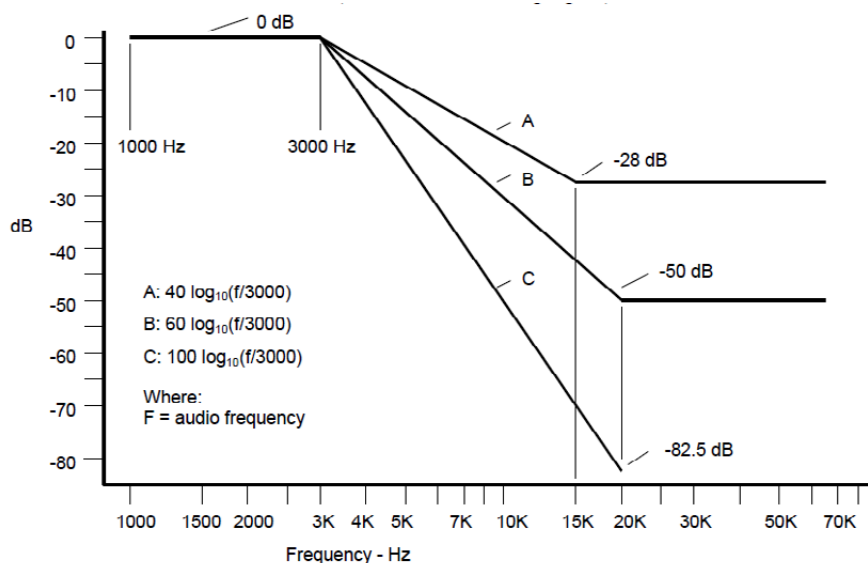
6.4.2. Test Result







6.4.3. Test Limit



For audio frequencies above 3000 Hz, the audio response of the post limiter low-pass filter shall meet or exceed the following requirements:

- a) For equipment operating on 20, 25 or 30 kHz channel bandwidth in the 25 MHz to 174 MHz range:

At frequencies from 3000 Hz through 15,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $40 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 15,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz, by at least: 28 dB.

- b) For equipment operating with 25 kHz bandwidth channels between 406 and 512 MHz through 896 MHz, and between 929 MHz through 930 MHz:

At frequencies from 3000 Hz through 20,000 Hz, the attenuation shall be greater than the attenuation at 1000 Hz by at least: $60 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

At frequencies above 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: 50 dB.

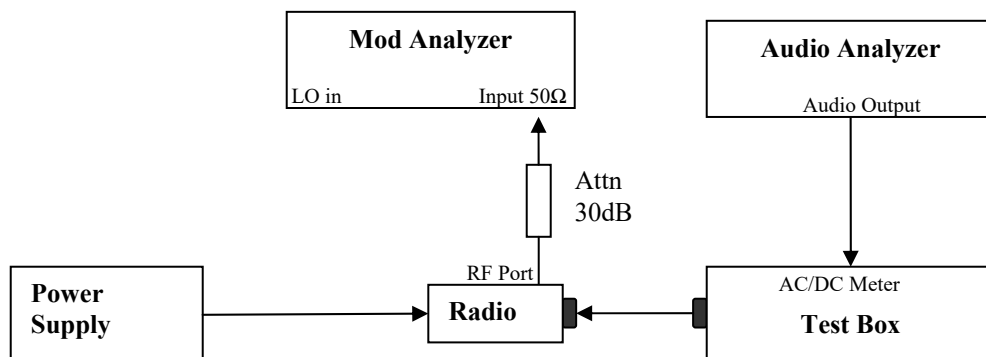
- c) For equipment operating on channels between 896 MHz through 901 MHz, between 935 MHz through 940 MHz, and 12.5 or 15 kHz spaced channels in the frequency range 138-174 MHz and 406-512 MHz.

At frequencies from 3000 Hz through 20,000 Hz the attenuation shall be greater than the attenuation at 1000 Hz by at least: $100 \log_{10}(f/3000)$ dB

where: f is the audio frequency in Hz.

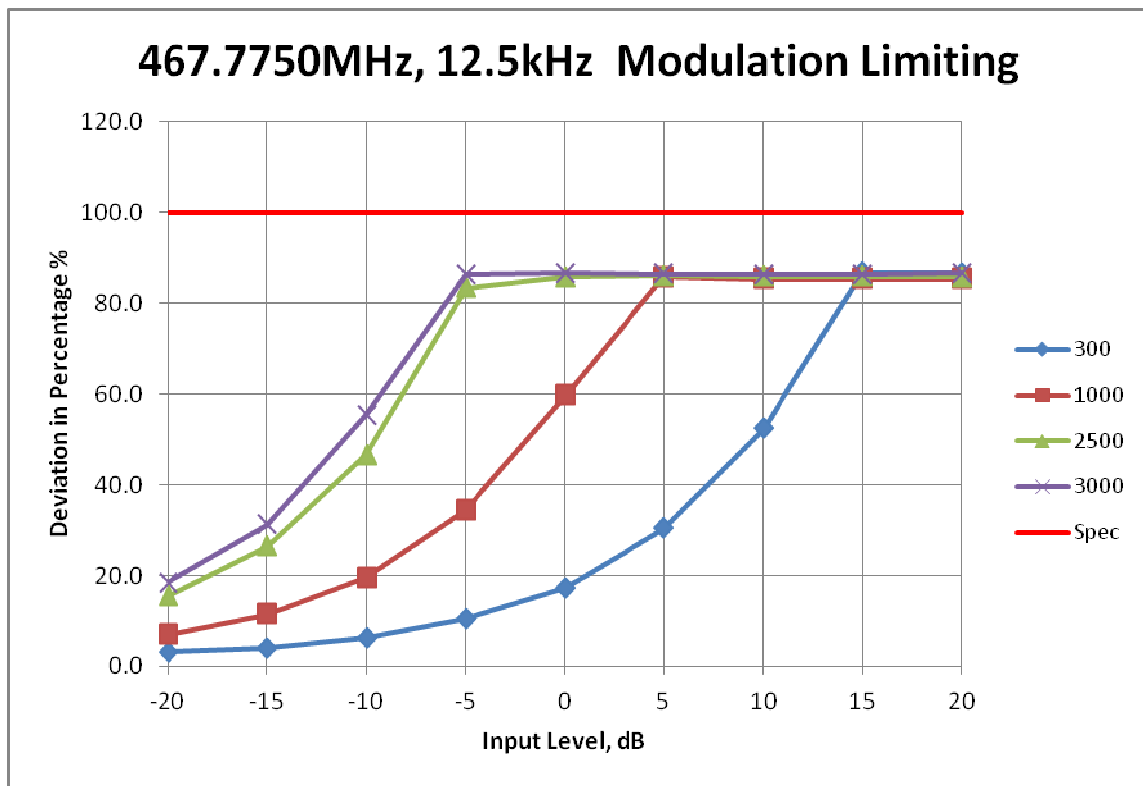
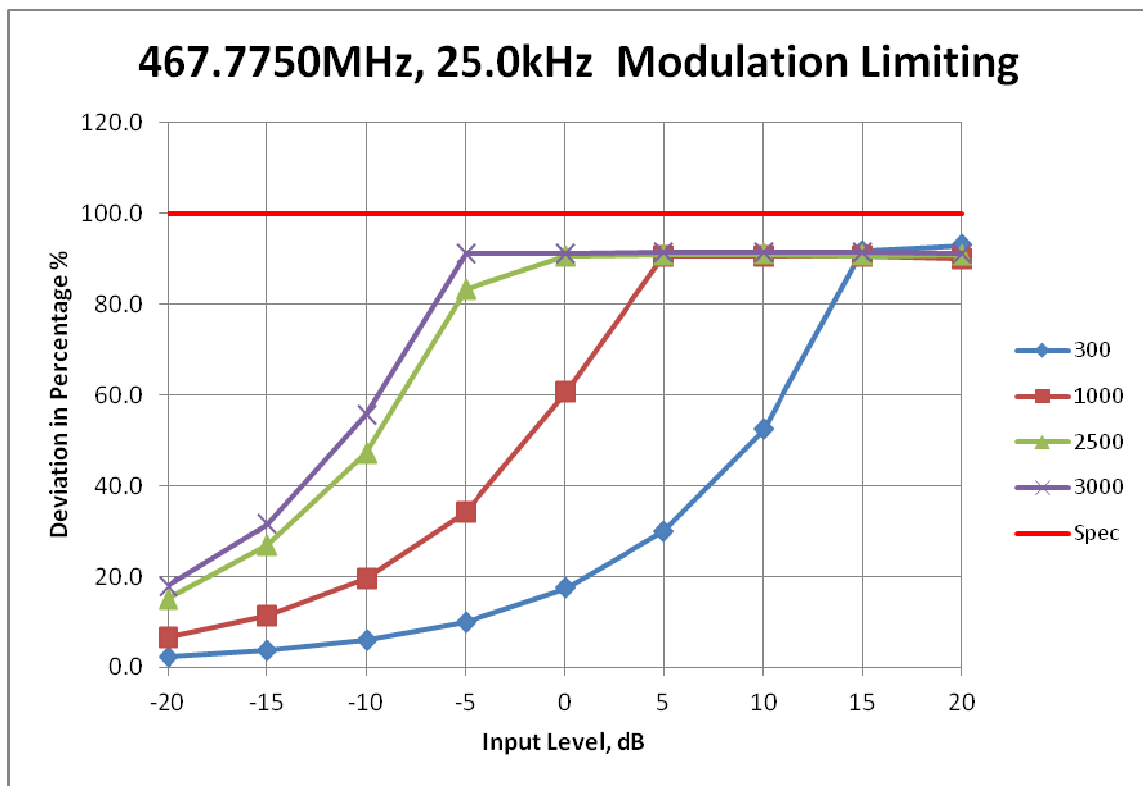
6.5. Modulation Limiting

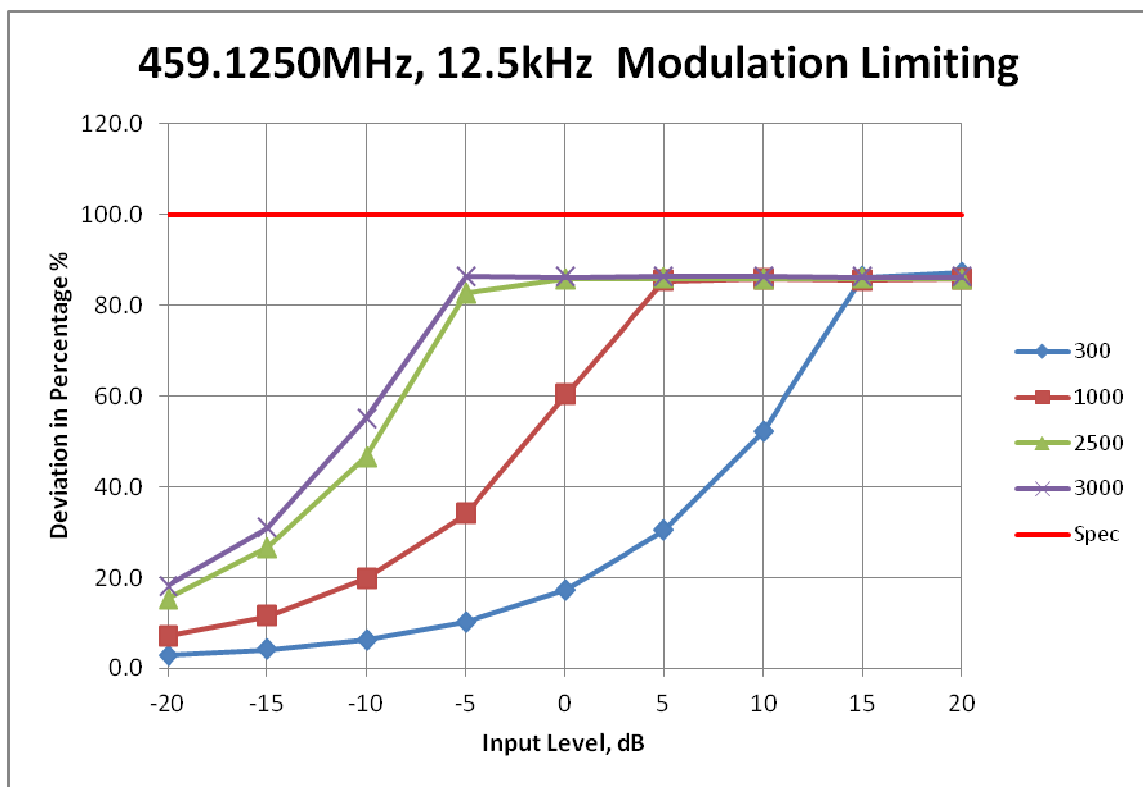
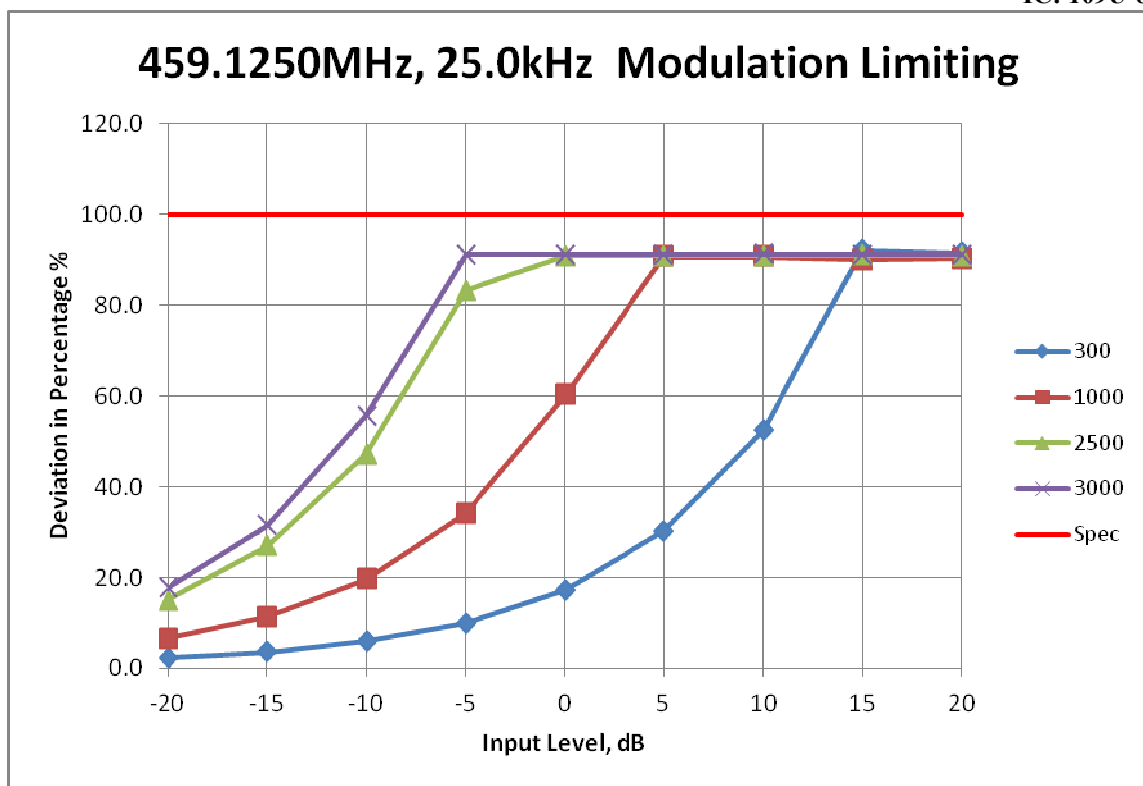
6.5.1. Test Setup

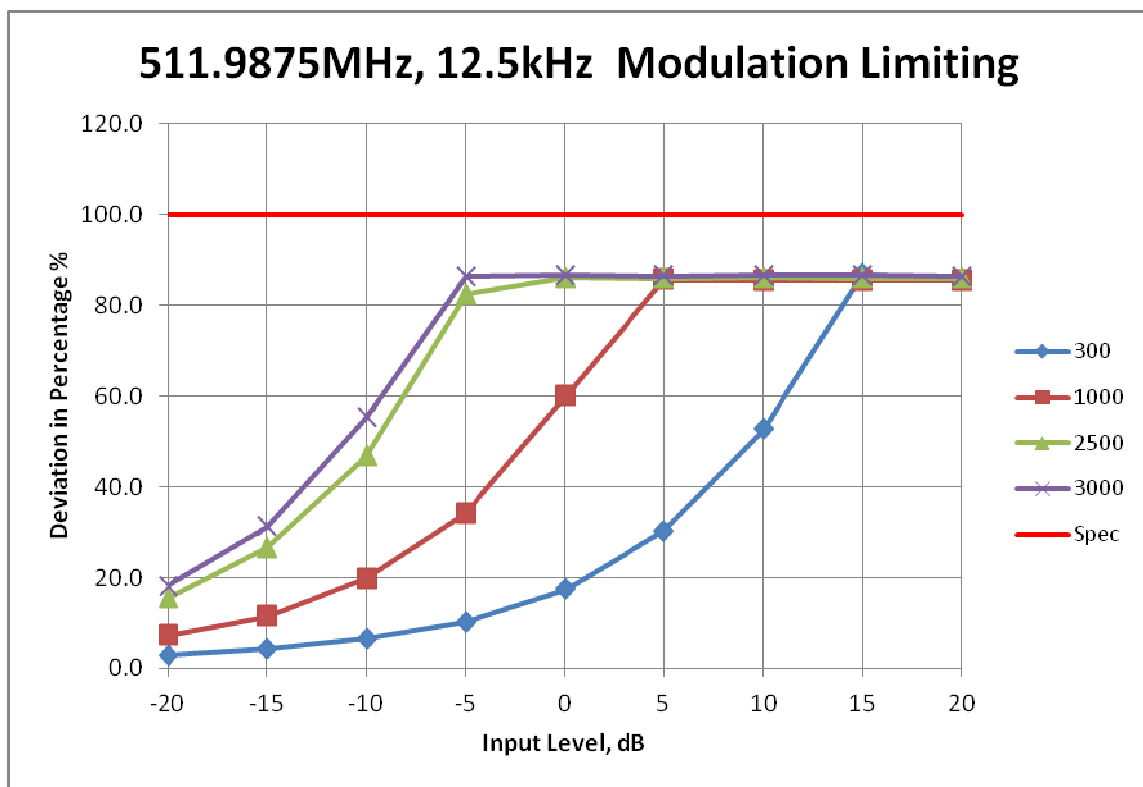
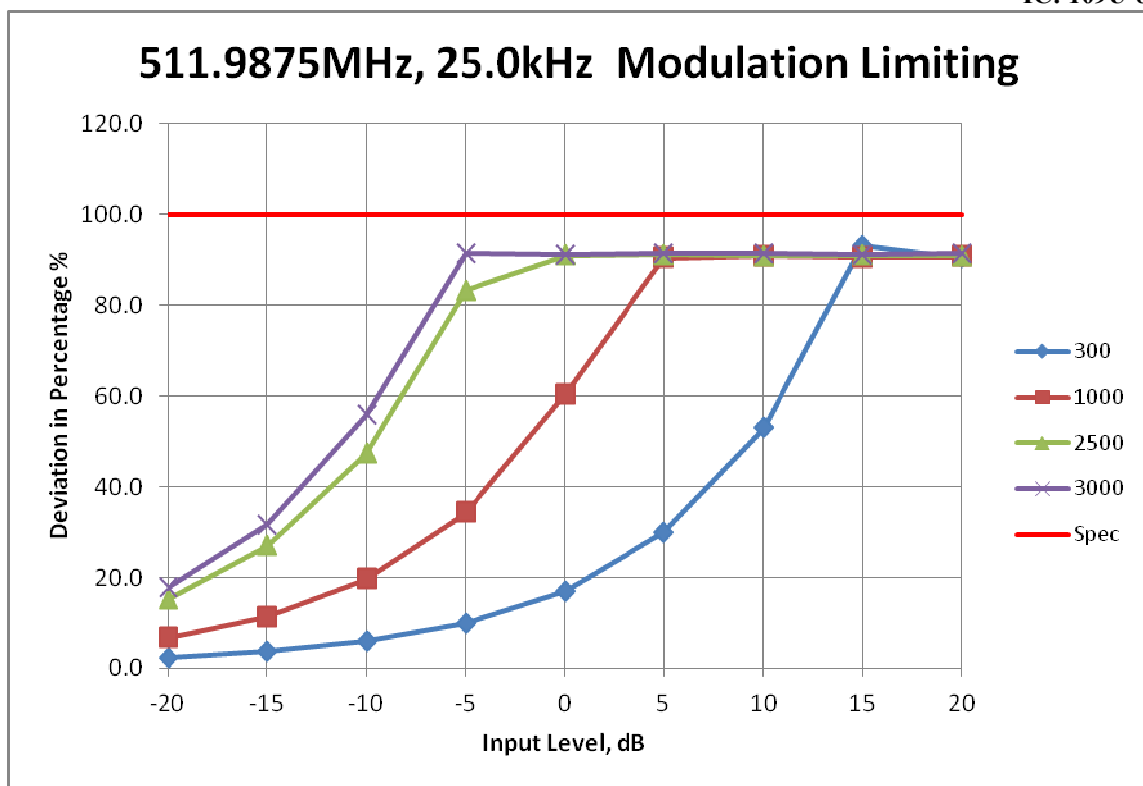


- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Path loss for the measurement included.
- 3) Set the audio bandwidth filter to 15 kHz.
- 4) Transmit the radio and set the audio analyzer to 1 kHz audio frequency and 60% of the Full rated system deviation.
- 5) Record the frequency deviation as 0dB input level at 1kHz audio frequency.
- 6) Repeat the step and record the frequency deviation from -20 dB to 20dB by 5 dB increments and different audio freq 300 Hz, 2.5 kHz and 3 kHz.

6.5.2. Test Result



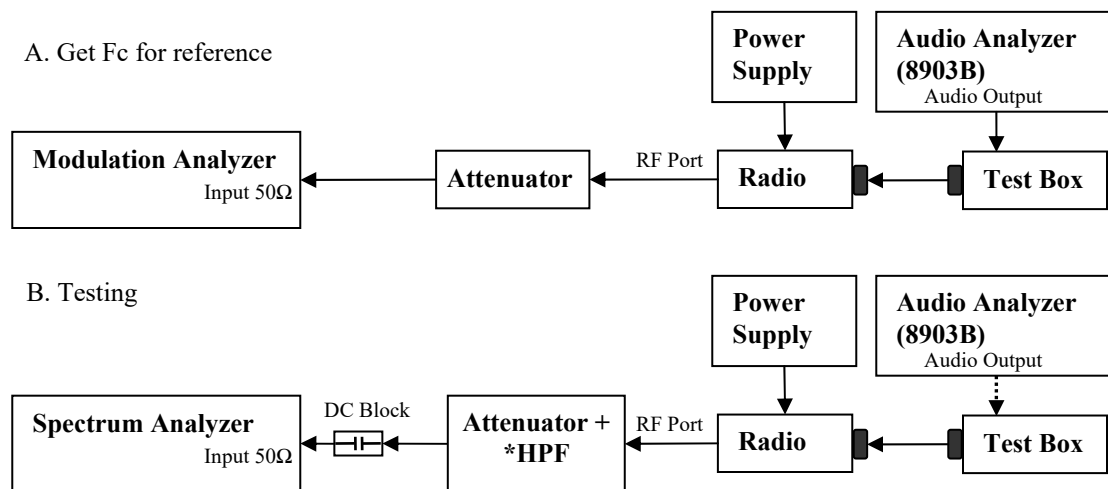




6.5.3. Test Limit
Modulation Limiting shall not exceed 100 percent.

6.6. Occupied Bandwidth

6.6.1. Test Setup (Analog)



- 1) The DUT transmitter output port was connected to Modulation Analyzer.
- 2) Set the audio bandwidth filter to 15 kHz low pass filter and 50 kHz high pass filter.
- 3) Transmit the radio and set the audio analyzer to 2.5 kHz audio frequency and 50% of the rated deviation. Up the amplitude by 16 dB. Dekey the DUT.
- 4) Path loss for the measurement included.
- 5) Select the Occupied Bandwidth measurement for 99% Emissions Bandwidth Measurement.
- 6) Key in the Fc and Resolution Bandwidth (1 ~ 5 % of emission designator).
- 7) Transmit the DUT and record the occupied Bandwidth frequency.
- 8) Preset the spectrum analyzer for sideband spectrum measurement.
- 9) Set the span and Resolution Bandwidth (according to FCC/ ISED standard).
- 10) Save the screen shot as modulated signal
- 11) Remove the audio tone from audio analyzer to capture unmodulated signal.

* Only HPF added for Mask 80.211 measurement with attenuator.

6.6.2. Test Result (Analog)

Standard Audio Modulation (25 kHz Channelization, Analog Voice):
 Emission Designator 16K0F3E

In this case, the maximum modulating frequency is 3 kHz with a 5 kHz deviation.

$BW = 2(M+D) = 2*(3 \text{ kHz} + 5 \text{ kHz}) = 16 \text{ kHz} \Rightarrow 16K0$
 F3E portion of the designator indicates voice.

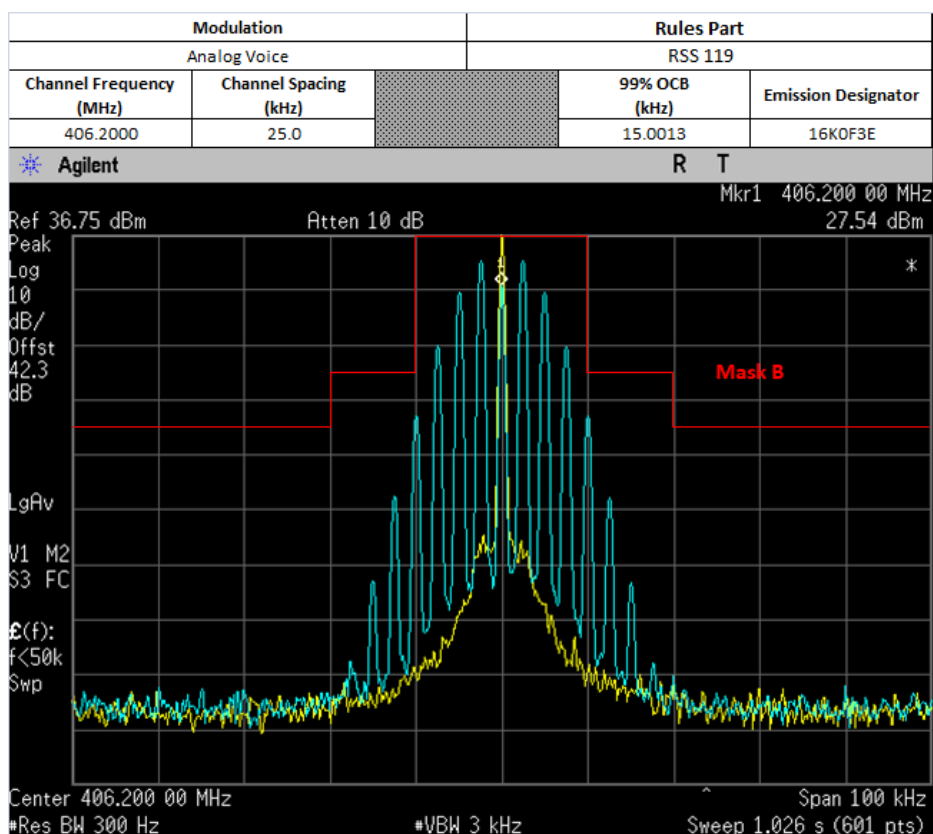
Therefore, the entire designator for 25 kHz channelization analog voice is 16K0F3E

Standard Audio Modulation (12.5 kHz Channelization, Analog Voice):
 Emission Designator 11K0F3E

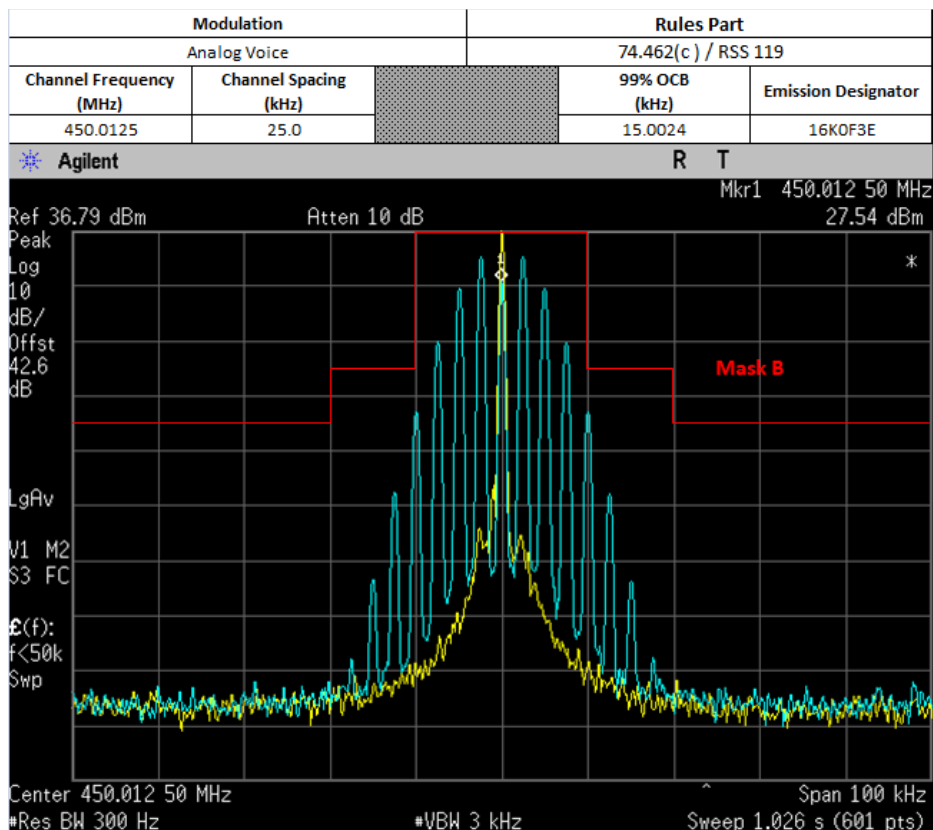
In this case, the maximum modulating frequency is 3.0 kHz with a 2.5 kHz deviation.

$BW = 2(M+D) = 2*(3.0 \text{ kHz} + 2.5 \text{ kHz}) = 11 \text{ kHz} \Rightarrow 11K0$
 F3E portion of the designator indicates voice.

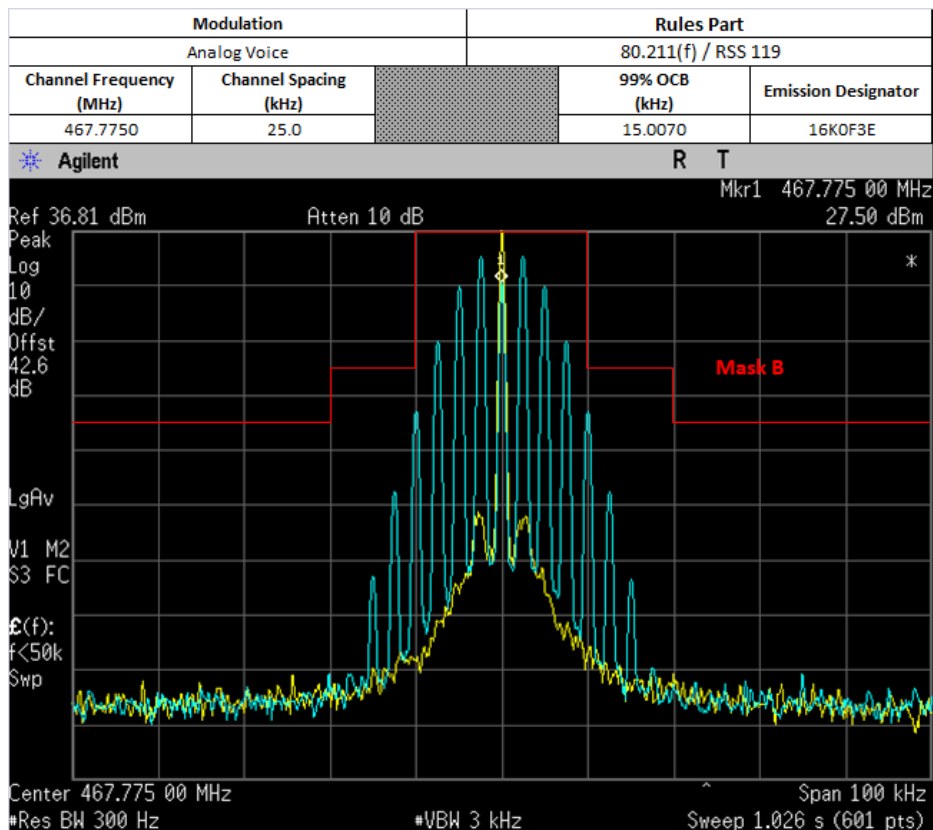
Therefore, the entire designator for 12.5 kHz channelization analog voice is 11K0F3E.



Not for FCC review



For Part 74



For Part 80 (NOT FOR FCC REVIEW)

